

Technology Profile Fact Sheet

Title: Method of Visualizing a Software Program

Aliases: HUMPS

Technical Challenge: Speeding up the performance of either the reverse engineering or debugging tasks would significantly decrease the cost of software development. Much effort goes into understanding the complex interactions of programs. In particular, reverse engineering is used to find security vulnerabilities that can cost companies billions, and debugging is used to find the cause of unintended behaviors that make programs fail. To perform these tasks requires extensive training and a “feel” for programming that, more than anything, only comes with years of experience.

Description: This software presents a way to examine and interact with program traces that allows a software analyst or debugger to understand the target program quickly through direct use of the unabridged traces, and without relying on summarized data. Tools to trace the execution of a program have existed for over a decade. Unfortunately, even toy programs are currently so complex as to limit the value of these traces. In practice, they are used primarily for performance profiling and code coverage testing, both techniques involving summarizing the trace in a way that loses much of the data contained in it.

The HUMPS tool reads program traces in a number of formats and builds an interactive visual chart of a single execution of the program. This chart makes innovative use of colors and chart heights to identify major areas of program function, and additional glyph marks to highlight such features as tight processing loops. It is intended to assist software engineers and analysts doing program testing, debugging, or reverse engineering and is designed to integrate easily with commercial programming environments or testing frameworks.

Demonstration Capability: A demonstration of this tool has been given.

Potential Commercial Application(s): This tool may be of interest to any software development toolmakers who produce programming, testing, or program analysis environments.

Patent Status: A patent application has been filed with the USPTO.

Reference Number: 1444